

Application No.: 10/017,661Docket No.: V9661.0024

REMARKS

Claims 1 to 10 are in the case. Claims 4 - 6 and 10 are allowed. No amendment is made in this submission. Reconsideration of the subject application in view of the following remarks is hereby respectfully requested.

Claim 1 was rejected under 35 U.S.C. § 102(b) as being unpatentable over U.S. Patent 6,025,697 to *Long et al.* for reasons set forth on page 2 of the Office action. This rejection is respectfully traversed.

The present invention recited in claim 1 is directed to an apparatus for providing power to a plurality of light emitting diodes for producing a desired color and brightness. The claimed apparatus comprises: (a) an inductor coupled in series with a first light emitting diode; (b) a second light emitting diode coupled in parallel to the inductor and the first light emitting diode such that the second light emitting diode is reverse biased when a power source drives a current through the inductor and the first light emitting diode; and (c) a switch controlling the connection of the inductor and the first light emitting diode to the power source. Applicants respectfully submit that the claimed invention is not disclosed by *Long et al.*

Long et al. discloses a process for charging a battery from an alternating current voltage which provides voltage to the battery in each direction. The charging current is regulated alternatively in a boost and buck mode as a function of an error (AI) between the instant value of the current and an instant value of a supply current following a pre-determined pattern. The activation of the modes of operation is controlled according to the sign of the error of the current (AI). *Long et al.* also discloses a battery charger for implementing the above charging process. The battery charger has two sub-assemblies for current regulation operating respectively in boost and buck modes, a subtractor for determining the error of current, and a common loop for feeding the sub-assemblies and controlling amplifiers for the activation, depending on the sign of the error.

Long et al., however, does not disclose light emitting diodes as recited in the claimed invention. "Parallel diode 3" and "series diode 6" in *Long et al.* are generic diodes used to rectify current. Those skilled in the art will understand that

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"parallel diode 3 " is for free wheeling, as mentioned in *Long et al.*, and that "series diode 6" is there for blocking battery 10 from being short circuit by switch 5. In contrast, the diodes in the claimed invention are light emitting diodes, which are capable of acting as loads to convert electrical energy to light energy.

Moreover, the topological structure of the claimed invention differs from that of *Long et al.* *Long et al.* discloses a battery charger, in which a battery is used and functions as the load. On the other hand, the claimed invention relates to an LED driver, which contains no battery or any other similar load. The light emitting diodes in the claimed invention serve a dual purpose as being the load and functional circuit elements. Therefore, the claimed invention patentably distinguishes over *Long et al.*

In view of the above, applicants respectfully submit that the above rejection is overcome and request that the examiner withdraw the subject rejection.

Claim 7 was rejected under 35 U.S.C. § 102(b) as being unpatentable over U.S. Patent 6,333,861 to *Goodman* for reasons set forth on pages 2 and 3 of the Office action. This rejection is respectfully traversed.

The present invention recited in claim 7 is directed to an apparatus for providing power to drive a plurality of light emitting diodes. The claimed apparatus comprises: a switching forward power converter with a transformer; a secondary winding coupled to the transformer having at least two terminals; a first light emitting diode having a first end and a second end, the first end of the first light emitting diode coupled to a first terminal of the secondary winding and the second end of the first light emitting diode coupled to a first end of an inductor and a first end of a second light emitting diode, wherein furthermore, a second end of the second light emitting diode being coupled to a second terminal of the secondary winding; and a third light emitting diode coupled in parallel with the series combination of the second light emitting diode and the inductor. Applicants respectfully submit that the claimed invention is not disclosed by *Goodman*.

Goodman discloses a forward converter incorporating a low loss snubber and transformer reset circuit. The transformer core of the forward converter is reset by the exchange of magnetizing energy between the transformer secondary winding

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and an appropriately sized capacitor of the reset circuit during the off period of the power switch. The exchange of magnetizing energy from the capacitor to the transformer secondary winding is independent of power switch operation.

Goodman, however, does not disclose light emitting diodes as recited in the claimed invention. The rectifiers in *Goodman* are generic diodes for rectifying current. Those skilled in the art will understand that diode 105 is for free wheeling, as mentioned in *Goodman*, and that diode 103 in *Goodman* is there to block the reverse voltage generated by the transformer 102. In contrast, the diodes in the claimed invention are light emitting diodes, which are capable of acting as loads to convert electrical energy to light energy.

Moreover, the topological structure of the claimed invention differs from that of *Goodman*. *Goodman* relates to a forward converter having an output capacitor 108. Those skilled in the art will understand that the output capacitor is used for connecting to an external load for ripple reduction. On the other hand, the claimed invention is directed to an LED driver comprising a light emitting diode (42) coupled to inductor (43) and light emitting diode (41). Such a claim feature is not disclosed in *Goodman*. Also, the light emitting diodes in the claimed invention are capable of functioning as the load and there is no external load or output capacitor. Therefore, the claimed invention patentably distinguishes over *Goodman*.

In view of the above, applicants respectfully submit that the above rejection is overcome and request that the examiner withdraw the subject rejection.

Claim 8 was rejected under 35 U.S.C. § 102(e) as being unpatentable over U.S. Patent 6,396,714 to *Kato* for reasons set forth on page 4 of the Office action. This rejection is respectfully traversed.

The present invention recited in claim 8 is directed to an apparatus for providing power to drive a plurality of light emitting diodes. The claimed apparatus comprises: a switching flyback power converter with a transformer; a plurality of secondary windings coupled to the transformer; and at least one light emitting diode coupled to each of two of the plurality of secondary windings. Applicants respectfully submit that the claimed invention is not disclosed by *Kato*.

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Kato discloses an active clamp forward converter that reduces the charging voltage of clamp capacitors as well as the voltage applied to switching elements, making it possible to reduce the on loss of the switching elements while also enabling the size of the capacitance elements to be reduced. The active clamp forward converter comprises first and second FETs which respectively connects first and second ends of a primary coil of the transformer to positive and negative terminals of a direct current power supply, and third and fourth FETs which respectively connects the first and second ends to the negative and positive terminals of a direct current power supply via capacitors. The pair of first and second FETs and the pair of third and fourth FETs are alternately switched on and off sandwiched about a period when both are off.

Kato, however, does not disclose light emitting diodes as recited in the claimed invention. The rectifiers in *Kato* are generic diodes for rectifying current. Those skilled in the art will understand that diodes 18 & 28 in *Kato* are for free wheeling and that diodes 19 & 29 in *Kato* are there to block the reverse voltage generated by transformer 17. In contrast, the diodes in the claimed invention are light emitting diodes, which are capable of acting as loads to convert electrical energy to light energy.

Moreover, the topological structure of the claimed invention differs from that of *Kato*. In *Kato*, the forward converter has output capacitors 20 and 21. Those skilled in the art will understand that the output capacitors are for connection to an external load for ripple reduction. On the other hand, the claimed invention comprises light emitting diodes directly coupled to transformer secondary windings—a feature not disclosed by *Kato*. Also, the load in the claimed invention is the light emitting diodes; there is no external load or output capacitor as employed by *Kato*. Therefore, the claimed invention patentably distinguishes over *Kato*.

In view of the above, applicants respectfully submit that the above rejection is overcome and request that the examiner withdraw the subject rejection.

Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Long et al.* for reasons set forth on pages 4 and 5 of the Office action. This rejection is respectfully traversed.

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Claim 3 depends from claim 1 and recites additional features. Because claim 1 is believed to be patentable over *Long et al.* in view of the above submission, claim 3 is thus believed to be allowable for at least the same reasons that claim 1 is allowable.

Moreover, claim 3 recites a series light emitting diode taking a current waveform same as the switch current. This feature can provide a complementary control to the light emitting diodes in the circuit. Applicants respectfully submit that it is not obvious for those skilled in the art to realize current waveform through this series light emitting diode complementing the other diodes. Therefore, the claimed invention patentably distinguishes over *Kato*.

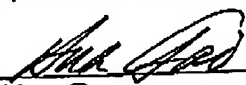
In view of the above, applicants respectfully submit that the above rejection is overcome and request that the examiner withdraw the subject rejection.

Based on the above remarks, applicants respectfully submit that each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejections of the claims and to pass this application to issuance. In case the Examiner does not agree with applicants' arguments presented above, applicants respectfully request that the Examiner telephone the undersigned to discuss the remaining issues to expedite the ultimate allowance of this subject application.

No fee is believe to be due for this Response. Should any fee be required, please charge such fee to Deposit Account No. 50-2215.

Respectfully submitted,

Dated: January 19, 2005

By  (40,414)
Hua Gao Reg. No. 40,414
Charles E. Miller Reg. No. 24,576
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
1177 Avenue of the Americas
New York, New York 10036-2714
Tel: (212) 835-1400